Work systems, Quality of Working Life and Attitudes of Workers. An Empirical Study towards the effects of Team and non-Teamwork.

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summary

In this article four different work systems are distinguished: the traditional Tayloristic system, 'lean' teamwork, 'sociotechnical' teamwork, and the professional work system. Using a survey design the association with several employee outcome variables is analysed. The results show that: 1) work system is an important factor for explaining differences in the quality of working life and attitudes of workers; 2) the Tayloristic work system clearly has detrimental effects on the well-being of workers. 3) in a survey design, comparing just teamworkers and non-teamworkers is not enough due to the heterogeneity of both categories.

1. Teamwork and work systems

A common theme in recent literature is the assumption that 'business as usual no longer works' (Appelbaum & Batt 1994). Organisations are looking for new organising principles and new relationships with employees in order to replace the traditional Taylorist or Fordist organisation, which is characterised by a high division of labour. Analytical concepts such as 'high-involvement workplaces', 'new production concepts', 'lean production' and 'post-Fordism' are used to describe these changes (compare Kern & Schumann 1984; Womack *et al*. 1990; Hammer & Champy 1993; Ichnioskwi *et al*. 1996; Gallie *et al*. 1998; Huys *et al*. 1999). It must be noted that although these concepts do describe real changes, the actual practice of organisational change is eclectic. Benders and Van Bijsterveld (2000) have illustrated this with respect to the introduction of lean production in Germany. Their study shows that although this concept has become fashionable, its meaning is continuously shaped and reshaped in the 'real-life' workplace. As a consequence the actual content of lean production is not only loosely coupled to its theoretical content, but also differs between various concrete situations.

Within the recent debate about new organising principles, a lot of discussion and research is focused on the introduction of teamwork. Teamwork is widely seen as an alternative way of organising work. Until the late 1980s it was primarily an important topic in the academic literature (Benders *et al*. 1999). Since then, there has been a strong increase in managerial interest (Proctor & Mueller 2000). According to a study by Osterman (1994), 54% of 600 leading enterprises in the US use self-directed teams, whereas the EPOC survey (Benders *et al*. 1999: 46) shows that in Europe, some sort of teamwork exists in about 36% of the workplaces. However,

differences between the various countries are large: in the Netherlands, for instance, the percentage of workplaces with some type of teamwork is about 48%.

Given the popularity of teams, both amongst academics and in organisational practice, a lot of attention is being devoted to the effects of teamworking on organisational and employee well-being. According to Benders *et al*. (1999: 35) advocates of teamwork have sent out the message that "teams are good for organisations and their members". Indeed, according to them the managerial belief in the economic advantages of teamwork is a driving force behind the use of teams. Moreover, it is suggested that teamworking leads to a higher output and less absenteeism. This implies less stressful work, a broader job content, less alienation, and improved relationships at work (see also Katzenbach & Smith 1993).

The benefits of teamwork are widely debated in empirical research. Some studies report a wide range of (organisational and employee) benefits, whereas others do not (Bacon & Blyton 2000; Harley 2001). Harley (2001) argues that both the positive and critical accounts concerning the effects of teamwork are based on limited evidence. According to him a major problem is that (large-scale) survey research is seldom used to test hypotheses. In this respect, Harley's (2001) own findings need to be mentioned. His study is based on the 'British Workplace Employee Relation Survey' conducted in 1997-1998. He compares non-teamworkers and workers in fully autonomous teams. A major advantage of his research design is that it is based on an extensive survey (28.000 employees working in 2000 different workplaces). Therefore, it is important to note that he finds no statistically significant association between teamworking and any employee outcome variable (task discretion, commitment, intrinsic satisfaction, management relations and stress). This leads him

to conclude that both positive and critical accounts of teamwork may have overstated its impact.

This conclusion is open to discussion as the team concept is ambiguous. Mueller *et al*. (2000) have shown that teamworking draws on a variety of traditions (the sociotechnical, the 'Humanization of Work', the employee involvement, and the 'Toyotist' trajectories), which have resulted in a number of different types and designs of teams. However, not only the concept itself is ambiguous, the actual use of teams by managers will – like the other new organising principles mentioned before – be eclectic. The introduction of teams in real-life organisations will rarely fully reflect the academic debate.

Nevertheless, there is a widespread consensus that two analytical types of teams can be distinguished, one representing a more fundamental reorganisation of work practices and one that represents less significant change (Bacon & Blyton 2000). The former is often related to (Swedish inspired) sociotechnical teams characterised by significant team autonomy, the latter to (Japanese inspired) 'lean' teams characterised by lesser autonomy. Bacon and Blyton (2000) refer to these two polar types as 'high road' and 'low road' teams (compare also Delbridge *et al*. 2000). Benders and Van Hootegem (1999), however, have warned that one has to be careful to use these taxonomies as they imply an oversimplification of reality.

In his study, Harley (2001) compares workers in an autonomous team with non-teamworkers. This is questionable on two accounts. Firstly – given the discussion above – one can argue that it is better to differentiate between at least two types of teams. Secondly and more importantly, however, it is probably mistaken to assume that non-teamworkers constitute a homogeneous group, because important differences exist between non-teamworkers in a Tayloristic setting, and non-teamworkers with a

lot of individual autonomy. The craftworker who figures so prominently in Piore and Sabel (1984) is *not* a teamworker, but *does* have a lot of autonomy. There are many similar examples of high autonomy non-teamworkers (like the university professor, the business consultant, or the plumber who carries out repairs at people's homes). Mixing them in an empirical analysis with Tayloristic non-teamworkers disturbs the effects the organisation of work has on relevant employee outcome variables.

Harley is probably right when he argues that large scale survey data are necessary to say something *in a general sense* about the experience of teamwork. However, in such a design it is too simple to compare just teamworkers and non-teamworkers. If one wants to analyse the effects of teamworking on employee outcome variables, it is necessary to distinguish at least four different types of work system that are generated by two dimensions: teamwork and autonomy (see figure 1).

Figure 1: Main work systems

	low autonomy	high autonomy
non-teamwork	Tayloristic	professional
teamwork	'lean' team	'sociotechnical' team

Of course, in 'real-life' workplaces the organisation of work is more hybrid and eclectic. These four types of work systems are analytical constructions intended to be used when aggregated data are analysed. This is exactly why more detailed case studies in 'real' organisations are also necessary: they fill in the abstract categories used in quantitative research. Nevertheless, these four systems do describe important differences between the work situations of workers.

The *Tayloristic* work system describes the work situation of workers at the lower end of the hierarchy in the traditional system. This traditional system is

characterised by tightly defined jobs, clear lines of demarcation separating the duties and rights of workers and supervisors, and decision-making powers in the hands of management (Ichniowski *et al*. 1996). The combination of the categories 'non-teamwork' and 'low autonomy' describes this work situation effectively.

Not everybody in a Tayloristic organisation has by definition a low autonomy job. As the principles proposed by Taylor imply a separation in the execution and planning of work tasks (Braverman 1974), some workers – especially in staff departments – will have a comparatively higher autonomy. Wright's (1979) concept of 'semi-autonomous employees' provides a good description of these workers' work situation. Moreover, as Esping-Andersen (1993) has pointed out, economic changes have lead to the formation of a 'post-Fordist' class structure. Professionals, characterised by a high education, service-orientated work, and a high degree of individual autonomy, constitute an important occupational group within this new class structure. Hence, there are abundant reasons to discern the professional work system – characterised by individual (non-team) work and a high individual autonomy – as a separate category.

The two systems of teamwork have already been dealt with. Analytically one can distinguish between teamworkers with a relatively low autonomy and teamworkers with relatively a high autonomy. I prefer to call these two types 'lean' and 'sociotechnical' teams as the conceptualisation of 'high' and 'low' road teamworking used by Bacon and Blyton also includes HRM policies with respect to the teams that are not included in my research design.

An important point that needs to be stressed is the fact that teamworkers and non-teamworkers have different types of autonomy. In figure 1 the autonomy for non-teamworkers refers to *individual* autonomy, the autonomy for teamworkers refers to

the (*collective*) autonomy for the workers *as a team* to do a task. This is clearly not the same. In fact, a sociotechnical team can have a lot of collective autonomy, whereas the autonomy of the individual team members is restricted. Not surprisingly, Sprigg *et al*. (2000) report different effects for individual and collective autonomy on employee strain and satisfaction depending on the characteristics of the production process.

In order to analyse the effects of teamworking, the analysis of Harley (2001) will be replicated in this article using a small Dutch data set. This leads us to the following research question. *To what extent does the type of work system employees work in, affect their quality of labour and several important work-related attitudes?*

In the next section the data set and the variables that are used to answer this question will be discussed and why the various dependent variables are included in the analysis will be explained. The results will be discussed in section three and the main conclusions will be stated in section four.

2. Data, variables and operationalisation

data

The data set consists of 835 (Dutch) workers in paid employment for at least 12 hours a week. The self-employed and small part-time job holders are therefore not included in the analysis. The data were obtained from a so-called Telepanel. This panel consists of people who in return for the free (private) use of a computer have to completely a weekly questionnaire. Researchers use this facility to obtain reliable data in a quick and efficient way. According to the organisers of the Telepanel it is representative of the entire Dutch population. I therefore assume that the subsample of workers is also representative for the Dutch working population. At the start of January 2000 a

questionnaire was submitted to 835 workers[1]. As a managerial team is clearly not the same as a team of workers (compare Harley 2001), workers with a managerial position were excluded from the analysis. This leaves a data set with 779 respondents.

Main independent variable: work system

The main independent variable is the work system the employees work in. The construction of this variable was inspired by the EPOC survey and is further outlined in Appendix 1. Interestingly, the lean work system is the system workers most frequently work in (34%). The professional and the Tayloristic work systems each describe the work situation of 27% of the workers, whereas only 12% work in a sociotechnical work system.

As the work situation of over a quarter of the workers can be described as Tayloristic, it becomes clear that the Tayloristic organisation is certainly not dead. The finding that 46% of the workers work in a team is comparable with the results of the EPOC survey about teamwork in the Netherlands that reports a percentage of 48%, although their percentage of sociotechnical teams is somewhat lower (12% versus 7%), their conclusion that this latter type of team work is rarely chosen is confirmed. This is also in accordance with other research (De Sitter *et al*. 1997; Bacon & Blyton 2000).

Dependent variables

quality of working life.

Teamwork is expected to have effects on the quality of working life. Two main dimensions of this are 'autonomy' and 'complexity' (Spenner 1985; De Witte &

[1] The survey was a co-initiative with Marco de Witte of the University of Groningen.

Steijn 2000). In the literature it is suggested that teamworkers will not only have more collective autonomy than workers in a Tayloristic system, but also more individual autonomy (Delbridge *et al*. 2000; Sprigg *et al*. 2000; Harley 2001). Moreover, as lean teams are sometimes described as neo-Tayloristic (Niepce & Molleman 1998), one can also argue that workers in a sociotechnical team will have more individual autonomy than workers in a lean team. The findings of Bacon and Blyton (2000) seem to confirm this. Yet what about workers in a professional work system? Given figure 1, one can expect that as team membership does not restrict the actions of these workers, their individual autonomy will, relatively speaking, be the highest.

With respect to *complexity* almost the same pattern can be expected. Given the division of labour in a Tayloristic work system, workers in this system will almost by definition hold a job with a relatively low complexity. In contrast, workers in a professional system will have a job with a relatively higher complexity. As teamwork implies the formation of more 'whole' jobs, one can expect both team systems will lie between these two extremes with respect to complexity. Again, this complexity for sociotechnical teams is expected to be higher compared to lean teams.

A third important aspect of the quality of working life is the *work pressure*. This is an objective aspect of the work situation measuring the work load that has to be distinguished from the (subjective) work stress it can evoke. This second aspect will be dealt with later. As teamworking in general is promoted to create a more flexible organisation (De Sitter *et al*. 1997; Mueller *et al*. 2000) the work pressure in team systems is expected to be higher compared to non-team systems. This follows from the fact that a more flexible organisation will more effectively use its human potential. If authors arguing that lean teams are introduced to let workers work harder

(Pruijt 1998; see also Knights & McCabe 2000) are correct, one can further expect a higher work pressure in lean teams compared to sociotechnical teams.

Each of these three dimensions in the quality of working life was measured by a set of items. To measure autonomy and complexity a popular Dutch instrument, the so-called NOVA-WEBA (Houtman *et al.* 1994), was used. Autonomy was measured with an eight-item scale[2] (Cronbach's alpha = 0.76). The scores on this scale ranged between 0 (low) and 8 (high). To determine the degree of complexity, eleven items were used[3]. These items also form a scale (Cronbach's alpha = 0.76), ranging from 0 (low) to 11 (high).

To determine the work pressure of the workers, a six-item scale was used. These items were taken from the NOVA-WEBA and from the so-called VBBA. Again, these items[4] formed a scale (Cronbach's alpha = 0.78), with a range from 0 (low) to 6 (high).

work related attitudes

The survey also included several work-related attitudes. The first one is the *work stress* the workers are experiencing. As stated above, work stress has to be distinguished from work pressure, as this latter variable is a characteristic of the work situation, whereas work stress is a characteristic of the person (compare Houtman 1999). This means that the resulting hypotheses will differ. Some authors argue that teamwork will lead to less stressful work (compare Benders *et al*. 1999: 35), others hold a different view (compare Knights & McCabe 2000). With respect to 'lean'

[2] On each item 'yes' and 'no' were the two possible answers. The scale included items such as 'Can you postpone the moment a task should be completed yourself?'; 'Can you leave easily your working place?', etc.

[3] The scale consists of 11 'yes' or 'no' items. This included items such as 'Does your work imply constant attention?'; 'Does your job almost entirely consist of difficult tasks?'

teams in particular it is argued that this leads to work intensification and hence more work stress. However, if Karasek's (1979) 'job decision - job demand model' is correct, one can formulate the hypothesis that the higher autonomy of teamworkers will lead to less work stress, because this autonomy gives workers the possibility to control their workload. If this argument is valid, workers in a Tayloristic work system will have the highest work stress, followed respectively by workers in a lean team, a sociotechnical team, and a professional work system.

A second work-related attitude is the *learning potential* the employees perceive. This potential is expected to be quite low in a Tayloristic work system (Ritzer (1993) has once said about these settings "a moron can do the job"). One can also expect that the learning potential for workers in a professional system will be quite high, as their potential to learn new things is by definition – given the nature of their jobs – quite high. One can also expect that this potential for both team-based work systems is higher compared to the Tayloristic work system as workers can learn from each other. If Hut and Molleman (1998) are correct, this potential will in sociotechnical teams be higher than in lean teams, because in the former 'double loop learning' results in the development of problem-solving skills.

Similar expectations can be put forward with respect to the perception of the *utilisation of capabilities*. The literature suggests teamwork leads to a higher utilisation of those capabilities. So again, this utilisation is expected to be relatively low for workers in a Tayloristic setting and higher for the teamworkers (and comparatively higher for those working in a sociotechnical team). As workers in a professional work system can make their own decisions, their utilisation of capabilities is expected to be the highest.

[4] Again the respondents could only choose between 'yes' or 'no'. The scale consists of items such as

An important variable is the *commitment* to the organisation. According to a widespread assumption the introduction of teamwork will lead to a more committed workforce (compare Bacon & Blyton 2000; Harley 2001). This not only holds for literature on teamwork, but also for literature about the 'end of the Fordist era' in general. Hence, the rise of concepts such as 'high-commitment work systems' (compare Roche 1999). Therefore, a similar distribution of the various work systems with respect to commitment can be expected: lowest for workers in a Tayloristic system, highest for workers in a professional system.

The last work related attitude is *job satisfaction*. Given the literature mentioned so far, the expectations are again similar. This satisfaction will be the lowest for those working in a Tayloristic work system, higher for those in lean teams, and still higher for those in sociotechnical teams. Furthermore, given the importance of autonomy for job satisfaction (De Witte & Steijn 2000) one can expect that job satisfaction for professional workers will be the highest.

These variables were measured as follows. To determine the work stress the workers were experiencing, a four-item scale[5] was used (Cronbach's alpha = 0.77). The respondents' scores ranged from 0 (low) to 8 (high).

To determine the learning capabilities the workers experienced, a four-item scale[6] was used. These items formed a weak scale with a Cronbach's alpha of 0.61. The scores ranged between 0 (low) and 4 (high).

With respect to the utilisation of capabilities only one item was present in the survey. The respondents were asked the following question: 'to what extent does your

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'Do you have to do a lot of work?' and 'Do you normally have enough time to finish your work?'.

[5] This scale is also used by Gallie *et al.* (1998) and consists of items such as: 'When I am at home, I keep worrying about problems at work'. The respondents could choose between three answer categories: 'that happens never', 'that happens sometimes', and 'that happens always'.

[6] Included were items such as 'Do you learn new things in your work?'. On each item the respondents could answer with 'yes' or 'no'.

work match all your competences, capabilities and work experience?' The answers ranged from 1 (never) to 4 (always).

To measure the workers' commitment to the organisation a three-item scale[7] was used (Cronbach's alpha 0.70). On the resulting scale the respondents scored between 3 (low) and 15 (high).

To determine the job satisfaction again a single item was used. The workers were asked the following question: 'All things being considered, are you satisfied or dissatisfied with your work?' Their answers ranged from 1 (very dissatisfied) to 5 (very satisfied).

Control variables

A simple bivariate analysis with work systems as an independent variable and the other variables as dependent is not enough to answer the research question. As Harley (2001) has explained, several control variables have to be included because not only the context in which teams operate is likely to influence outcomes, but also because employee outcomes vary systematically with employee, industry or workplace characteristics. The following control variables are therefore included in the analysis: gender, weekly working hours, organisational size, economic sector (private or public), supervision (workers with a lower supervisory position are discerned from workers without supervision), type of contract (flexible or permanent), technology, and occupational category.

The measurement of the last two variables needs some explanation. With respect to technology two dummy variables are included in the analysis: the first discerns workers making a limited use of information technology in their work (less

than 15%) and workers using it more often; the second dummy differentiates workers working for a substantial amount of their working time (more than 50%) with information technology from those using it less often.

To measure the occupational category, a collapsed version of the class scheme of Esping-Andersen containing the following categories was used[8]: professionals, semi-professionals (mostly teachers, nurses, welfare workers), technicians (like engineers), clerical workers, sales workers, lower service workers (cooks, cleaners), and manual workers.

3. Results

To determine the effects of the several independent variables a UNIANOVA-procedure (SPSS10.0) has been used. This makes it possible to include both nominal variables (like work systems) and (linear) covariates simultaneously in the analysis. Moreover, not only the main effects of the variables are calculated, but – holding the effects of the covariates constant – it can also be tested whether the mean scores on the dependent variables of the four types of work systems differ significantly.

The results of this analysis[9] are presented in Table 1, which contains only statistically significant effects.

[7] It consists of items such as 'I am prepared to work harder if that can contribute to success of the organisation I work for'. The respondents could choose between five answer categories ranging from 'totally agree' to 'totally disagree'.
[8] The class scheme of Esping-Andersen also includes 'managers' as a separate category. However, as explained earlier, this category is excluded.
[9] In fact, the output of SPSS gives the parameter effects in eta^2. These have been recalculated into an eta coefficient and (-) signs have been added to visualise the direction of the effects.

Table 1: results of multivariate analysis

	autonomy	complexity	work pressure	workstress	learning	commitment	using capabilities	job satisfaction
	èta	èta	èta	èta	èta	èta	èta	èta
covariates								
female		.08*	.09*	.16*				
organization size							-.10*	
public sector	.10**							
supervision	.12*	.14**	.09*		.10*			.09*
weekly working hours		.20**	.13**	.17**	.11*			
permanent contract		.11*			-.13**	.13**	.17**	
not using technology		-.10*						
moderately using technology								
factor variables								
occupation	.22**	.23**		.14*	.18**			
work system	.27**			.12*	.19**	.16**	.15*	.15**
occupation * work system								
R^2 and (N) *P < 0.05 ** p < 0.01	.27 (676)	.19 (676)	.04 (676)	.07 (676)	.15 (676)	.06 (676)	.08 (676)	.06 (676)

The first thing to be noted is that in most cases the overall explained variance is quite low. Only with respect to autonomy, complexity and to a lesser extent learning is a more substantial part of the variance in the dependent variables explained.

Although the overall results are therefore somewhat meagre, it is important to note that the work system variable is the only variable with a statistically significant effect with respect to six of the eight dependent variables. Its importance is further illustrated by the fact that its 'eta' effects are in most cases higher than those of the other variables. In other words: work systems are an important factor for the quality of working life and the shaping of attitudes of workers. This is especially true with respect to autonomy (eta = 0.27), learning (eta = 0.19), and commitment (eta = 0.16). Surprisingly, significant effects on the complexity of the work and work pressure are absent. Therefore, teamworking seems to result in neither a higher nor a lower work pressure.

The effect of work systems on the dependent variables is the main focus in this article. With respect to the other independent variables, however, the almost complete absence of significant effects of technology is striking. This is at odds with technological determinism as it shows technology is not an important variable for employee outcome variables. It is clear that the way work is organised (here measured by the work system variable) is much more important.

Although the relative importance of work systems is now clear, we still do not know how it is related to the dependent variables. Are our expectations with respect to the differences between the four types of work systems confirmed, or not? For this, Table 2 is important. Using an LSD test, it was ascertained whether the four work systems differ significantly from each other (holding the effects of the other independent variables constant). In the table each significant effect ($p < 0.05$) is given and the exact differences in mean scores on the dependent variable are also included between brackets.

Table 12

	Taylorist (T)	Professional/Craft (C)	'normal' team (TM)	autonomous team (A)
autonomy	T vs C (-1.70) T vs TM (-.82) T vs A (-.98)	C vs T (1.70) C vs TM (.88) C vs A (.72)	TM vs T (.82) TM vs C (-.88)	A vs T (.98) A vs C (-.72)
complexity	none	none	none	none
work pressure	none	none	none	none
work stress	T vs C (.55) T vs A (.86)	C vs T(-.55)		A vs T (-.86)
learning	T vs C (-.53) T vs TM (-.58) T vs A (-.67)	C vs T (.53)	TM vs T (.58)	A vs T (.67)
commitment	T vs C (-1.03) T vs TM (-.74) T vs A (-.78)	C vs T (1.03)	TM vs T (.74)	A vs T (.78)
using capabilities	T vs TM (-.20) T vs A (-.29)		TM vs T (.20)	A vs T (.29)
job satisfaction	T vs C (-.35) T vs TM (-.24) T vs A (-.38)	C vs T (.35)	TM vs T (.24)	A vs T (.38)

This table can be read as follows. With respect to (for instance) learning, workers in a Tayloristic work system (T) learn on average significantly less new things than workers in a professional work system (P, mean difference: -0.53), workers in a lean team (L, mean difference -0.58), and sociotechnical teamworkers (S, mean difference: -0.67). In this case, the other mean scores between the various work systems are not significantly different.

Overall, with the exception of autonomy, the same picture emerges. The mean scores of workers in a Tayloristic work system differ significantly from (some of) the other work systems, but at the same time no significant differences between mean scores of the other three work systems exist. Our expectations about differences between the three non-Tayloristic work systems are therefore not confirmed. Nevertheless, as in most cases the differences between Tayloristic workers and professional workers are quite substantial, our main assumption that non-teamworkers form a heterogeneous category that cannot be treated as a single category is validated.

The results will now be discussed in more detail.

Autonomy: According to table 1 the type of work system is related to the (individual) autonomy of workers. Table 2 shows that almost all differences between the three categories are statistically significant. Professional workers clearly have more autonomy than teamworkers, who in turn have more autonomy than workers in a Tayloristic work system. However, the individual autonomy of lean and sociotechnical teamworkers does not differ (by definition the group autonomy of the latter, however, is of course higher).

Work stress: Workers in a professional and a sociotechnical team work system experience a lower stress than workers in a Tayloristic work system. Given the finding that the level of work pressure in the four work systems does not differ, this

suggests the individual and collective autonomy of these workers play a role in reducing work stress resulting form the objective work load (compare with the Karasek hypothesis mentioned earlier).

Learning: These differences have already been mentioned. All three non-Tayloristic work systems offer significantly better learning potential than the Tayloristic system. The expectation that sociotechnical teams offer better learning possibilities than lean teams, however, is not confirmed.

Commitment: The commitment of workers in the Tayloristic work system is substantially lower than in each of the other three work systems. However, again differences between these last three are not significant.

Using capabilities: Lean and sociotechnical teamworkers use their capabilities more often than workers do in a Tayloristic system. Workers in a professional system do not differ in this respect from workers in the other work systems.

Job satisfaction: Workers in a Tayloristic work system are less satisfied with their job than workers in all three other work systems. Again, however, there are no other significant differences between these other three.

4. Conclusion

The findings amend the conclusion of Harley that teamwork does not affect employee outcome variables. His finding can probably be explained by the fact that non-teamwork does not constitute a homogenous category, but contains at least two categories that have to be analytically distinguished: non-teamworkers with low individual autonomy (working in a Tayloristic organisation) and non-teamworkers with high individual autonomy (in a professional environment). These categories

differ substantially, but they cancel each other out when compared with categories containing teamworkers.

Differences between the two team categories were also expected, but these did not materialise. Statistically significant differences between these two categories were not found with respect to any of the employee outcome variables included in this analysis. This is at odds with literature suggesting that ‘high road’ teamworking has a more positive impact on employee well-being than ‘low road’ teamworking. Several factors can explain this. A first explanation has to do with the way teamwork is measured. Although our percentage of sociotechnical teams is quite low, it is relatively high compared to other research (compare with section 2). A stricter measure of sociotechnical teams may possibly be used in future research.

A second explanation could be that the effects of the several types of teamwork are mediated by the context it is introduced in. It could be that a survey design is too general to detect differences in effect between the two types of teams. This stresses the need to also use case studies to look in more detail at teamworking.

Nevertheless, the analysis also shows that Tayloristic work systems have detrimental effects on employee well-being. For almost all dependent variables workers in a Tayloristic work system scored substantially lower compared to other workers. On average, these workers have a lower (individual) autonomy, greater work stress, less chances to learn new things, a lower commitment, a lower job satisfaction and make less use of their capabilities than workers in the other work systems. This suggests that the introduction of teamwork of either type will have positive effects on employee well-being. The same, however, is true for the introduction of a work system that delegates substantial individual autonomy to the workers without at the same time introducing teamwork.

The question as to which non-Tayloristic work system will have the most beneficial effects cannot be answered in this article. However, this will probably depend on contingent factors such as the kind of work, the constitution of the labour force, the economic sector, and the history of the organisation.

An important, final, conclusion is that the inclusion of a variable measuring work-systems research proves to be very useful in survey research. Compared to the other independent variables this variable was the most important one in the present study. This yet again illustrates the importance of the organisation of work for employee well-being.

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Appendix 1. Construction of the 'Work system' variable

The construction of this variable is based on the EPOC survey (Benders *et al*. 1999). This survey contains the following question: 'Has the management given to formally introduced GROUPS the right to make decisions on how their work is performed on a Group basis without reference to immediate managers for *one or more* of the following?' Eight aspects of work the teams could possibly decide about followed this question.

As the EPOC survey was directed towards managers and not to employees, a slightly different formulation of the question was required for the Telepanel survey. Moreover, in order to measure non-team work systems the answer categories have to be broadened. So, the following question was included:

With regard to the organisation and content of work a lot of decisions have to be taken. For several aspects of your work we want to know whether you can take decisions about that aspect yourself or are these taken by other people. For each aspect there are three possibilities:

1) the decision about the aspect is primarily taken by others (for instance your supervisor, management);
2) the decision about the aspect can be taken by yourself;
3) the decision about the aspect can be taken by the team you belong to (in this case the decision is therefore a mutual responsibility of yourself and your colleagues).

Next, the respondent was asked to state which of these three possibilities best described his work situation for six of the aspects. These aspects were: the planning of the work, the quality of the product or service, improving work processes, contacts with (internal or external) customers, the work schedule and/or the work hours, and the working conditions.

To determine which work system an employee works in, it was observed whether or not a respondent chose one of the three answer categories more often than each of the other two.

1) If a respondent chose the first answer category (decisions are taken by others) at least three times, the work system is described as *Tayloristic*;
2) If a respondent chose the second answer category (decision are taken by myself) at least three times, the work system is described as *professional*;
3) If a respondent chose the third answer category (decision are taken by the team) three or four times, the work system is described as a *lean team*;
4) If a respondent chose the third answer category (decision are taken by the team) five or six times, the work system is described as a *sociotechnical team*;

When two answer categories were both chosen three times (7% of the cases), the work system was defined as 'hybrid'. This category is not included in the analysis.

Table 1: Results of UNIANOVA analyses.

	autonomy	complexity	work pressure	work stress	learning	commitment	using capabilities	job satisfaction
	eta	eta	eta	eta	eta	eta	eta	eta
covariates								
female		0.08*	0.09*	0.16*				
organisation size							-0.10*	
public sector	0.10**							
supervision	0.12*	0.14**	0.09*		0.10*			0.09*
weekly working hours		0.20**	0.13**	0.17**	0.11*			
permanent contract		0.11*			-0.13**	0.13**	0.17**	
not using technology		-0.10*						
moderately using technology								
factor variables								
occupation	0.22**	0.23**		0.14*	0.18**			
work system	0.27**			0.12*	0.19**	0.16**	0.15*	0.15**
occupation * work system								
R^2 and (N) *P < 0.05 ** p < 0.01	0.27 (676)	0.19 (676)	0.04 (676)	0.07 (676)	0.15 (676)	0.06 (676)	0.08 (676)	0.06 (676)

Table 2: Significant differences between the effects of four types of work organisation on outcome variables, after adjustments for effects other independent variables (LSD test).

	Taylorist (T)	Professional (P)	lean team (L)	sociotechnical team (S)
autonomy	T vs. P (-1.70) T vs. L (-0.82) T vs. S (-0.98)	P vs. T (1.70) P vs. L (0.88) P vs. S (0.72)	L vs. T (0.82) L vs. P (-0.88)	S vs. T (0.98) S vs. P (-0.72)
complexity	none	none	none	none
work pressure	none	none	none	none
work stress	T vs. P (0.55) T vs. S (0.86)	P vs. T(-0.55)		S vs. T (-0.86)
learning	T vs. P (-0.53) T vs. L (-0.58) T vs. S (-0.67)	P vs. T (0.53)	L vs. T (0.58)	S vs. T (0.67)
commitment	T vs. P (-1.03) T vs. L (-0.74) T vs. S (-0.78)	P vs. T (1.03)	L vs. T (0.74)	S vs. T (0.78)
using capabilities	T vs. L (-0.20) T vs. S (-0.29)		L vs. T (0.20)	S vs. T (0.29)
job satisfaction	T vs. P (-0.35) T vs. L (-0.24) T vs. S (-0.38)	P vs. T (0.35)	L vs. T (0.24)	S vs. T (0.38)